(VEGF) proteins; mutant neurotrophin family proteins such as mutant nerve growth factor (NGF), mutant brain-derived neurotrophic factor (BDNF) proteins, and mutant neurotrophin-3 (NT-3) and mutant neurotrophin-4 (NT-4) proteins; mutant transforming growth factor-ß (TGF-ß) family proteins such as mutant TGF-ß1, mutant TGF-ß2, mutant TGF-ß3, mutant TGF-ß4/ebaf, mutant neurturin, mutant inhibin A, mutant inhibin B, mutant Activin A, mutant Activin B, mutant Activin AB, mutant Müllerian inhibitory substance (MIS), mutant bone morphogenic Protein-2 (BMP-2), mutant bone morphogenic protein-3 (BMP-3)/osteogenin, mutant bone morphogenic protein-3b (BMP-3b), mutant bone morphogenic protein-4 (BMP-4), mutant bone morphogenic protein-5 (BMP-5) (precursor only), mutant bone morphogenic protein-6 (BMP-6)/Vgrl, mutant bone morphogenic protein-7 (BMP-7)/osteogenic protein (OP)-1, mutant bone morphogenic protein-8 (BMP-8)/osteogenic protein (OP)-2, mutant bone morphogenic protein-10 (BMP-10), mutant bone morphogenic protein-11 (BMP-11), mutant bone morphogenic protein-15 (BMP-15), mutant Norrie Disease protein (NDP), mutant Growth/Differentiation Factor-1 (GDF-1), mutant Growth/Differentiation Factor-5 (GDF-5) (precursor only), mutant Growth/Differentiation Factor-8 (GDF-8), mutant Growth/Differentiation Factor-9 (GDF-9), mutant Glial Cell-Derived Neurotrophic Factor (GDNF)/Artemin, and mutant Glial Cell-Derived Neurotrophic Factor (GDNF)/Persephin proteins. Accordingly, the present invention provides methods for using mutant CKGFs, CKGF analogs, fragments, and derivatives thereof for treating or preventing diseases. Pharmaceutical and diagnostic compositions, methods of using mutant CKGF proteins, including TSH heterodimers and TSH analogs with utility for treatment and prevention of metabolic and reproductive diseases are also provided.

Please delete the fourth full paragraph at page 73, lines 22 to 27 and insert therefor the following:

--Introducing acidic amino acid residues where basic residues are present in the hCG beta-subunit monomer sequence is also contemplated. In this embodiment, the variable "X" corresponds to an acidic amino acid. The introduction of these amino acids serves to alter the electrostatic character of the L1 hairpin loops to a more negative state. Examples of such amino acid substitutions include one or more of the following K2Z, R6Z, R8Z, R10Z, and K20Z, wherein "Z" is an acidic amino acid residue.--

a2

Please delete the third full paragraph at page 74, lines 19 to 23 and insert therefor the following:

--In another aspect of this embodiment, neutral or acidic amino acid residues in the hCG β subunit, L3 hairpin loop are mutated. The resulting mutated subunits contain at least one mutation in the amino acid sequence of SEQ ID NO: 3 at the following amino acid positions: N58B, Y59B, D61B, V62B, F64B, E65B, S66B, I67B, L69B, P70B, G71B, P73B, G75B, V76B, N77B, P78B, V79B,V80B, S81B,Y82B, A83B,V84B, A85B, L86B, and S87B. "B"is a basic amino acid.--

a3

Please delete the fourth full paragraph at page 74, lines 24 to 28 and insert therefor the following:

--The invention further contemplates introducing one or more acidic residues into the amino acid sequence of the hCG beta-subunit L3 hairpin loop. For example, one or more acidic amino acids can be introduced in the sequence described above, wherein the variable "X"

a4

a4 corresponds to an acidic amino acid. Specific examples of such mutations R60Z, R63Z, R68Z, and R74Z, wherein "Z" is an acidic amino acid residue.--